

SEABED SONAR MATRIX SYSTEM

ABSTRACT OF THE DISCLOSURE

A system for sonically probing a seabed comprises at least one row (14) of transducers (22) that each can produce a sonic beam, and at least one sonic detector (24). Each transducer is independently energized to produce a narrow sonic beam (40), with resulting seabed or subsea echoes being detected to produce one pixel of a display (60, 80, 90, 150) formed by an X-Y array of pixels, before a next transducer is energized and its echoes are detected to produce another pixel of the display. When the system detects a large change in echo amplitude at adjacent seabed locations, then scanning at those locations is accentuated by analysis and by additional sonification at different frequencies. The transducers are closely spaced, at a center-to-center distance (G) of less than 25 cm, to provide good horizontal resolution and usually lie within 6 meters from the seabed. Each transducer is energized to produce a sonic pulse which, dependent on the application, has a carrier frequency (32) of at least 200 kHz. This results in an optimized narrow sonic beam, with each pulse having a duration (A) on the order of 10 to 100 microseconds to produce a modulation frequency on the order of 200 kHz to 5 kHz, and with each pulse having a high maximum energy to create a wide frequency bandwidth in the seabed.